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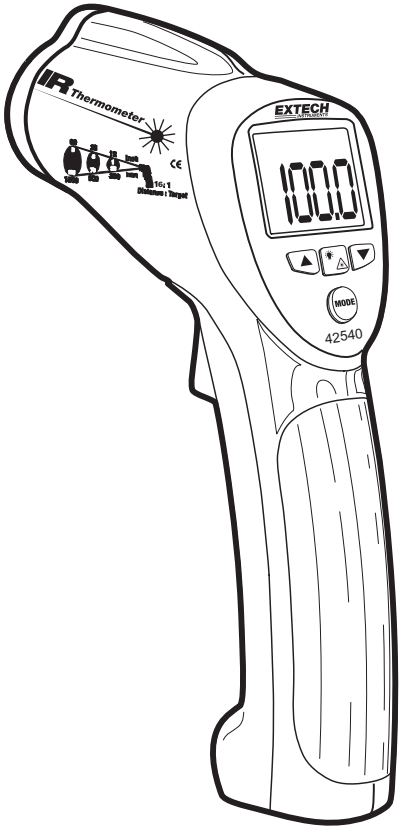
User's Manual

Extech 42540-NIST High Temperature IR Thermometer
Extech 42540 High Temperature IR Thermometer

High Temperature InfraRed Thermometer
with Laser Pointer

MODEL 42540A



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Introduction

Congratulations on your purchase of the Model 42540A IR Thermometer. The 42540A is capable of non-contact (infrared) temperature measurements at the touch of a button. The built-in laser pointer increases target accuracy while the backlit LCD and handy push-buttons combine for convenient, ergonomic operation. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

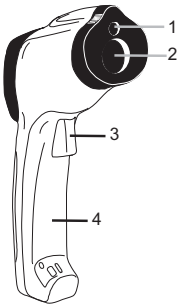
Safety

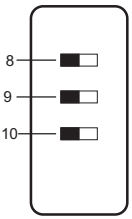
- Use extreme caution when the laser pointer beam is on
- Do not point the beam toward anyone's eye or allow the beam to strike the eye from a reflective surface
- Do not use the laser near explosive gases or in other potentially explosive areas

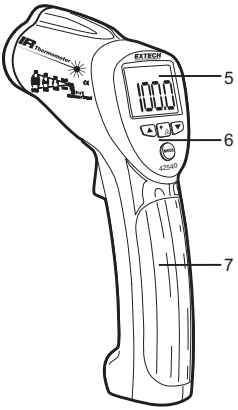
Meter Description

1. Laser pointer beam
2. IR Sensor
3. Measurement Trigger
4. Battery and Switch Compartment
5. LCD Display
6. Push-buttons
7. Handle Grip
8. Temperature Units (ºC/ºF) Switch
9. Test Lock ON/OFF Switch
10. Alarm ON/OFF Switch

Note: There is a tripod mount on the bottom of the handle







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Operating Instructions

Basic IR Measurements

1. Hold the meter by its handle and point it toward the surface to be measured.
2. Pull and hold the trigger to turn the meter on and begin testing. The temperature reading, the flashing 'SCAN' icon, the emissivity, and the unit of measure will appear. Note: Replace the 9V battery if the display does not switch on.
3. Release the Trigger and the reading will hold for approximately 7 seconds (HOLD will appear on the LCD) after which the meter will automatically shut off. The only exception to this is if the TEST LOCK switch is set to ON.

   Note: Select the temperature units (ºF/ºC) using the top switch inside the battery compartment

Backlight/Laser Pointer

1. While pulling the Trigger, push the backlight/laser button once to turn on the backlight.
2. Press it again to turn on the laser pointer. When the laser is ON the laser icon will appear in the LCD.
3. Press the laser button to turn the backlight off.
4. Pressing it again turns the laser off.

   Note: Backlight and Laser settings will be retained after the meter powers down.

Over-range Indication

If the temperature measurement exceeds the specified temperature range, the thermometer will display dashes in place of a temperature reading.

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The MODE button options

The MODE button is used to access the programming functions of the instrument. The selected function is displayed on the bottom line of the LCD. Each parameter is listed below with an explanation for its use. Press the MODE button to step from one parameter to the next.

EMS (Emissivity Value)

To change the emissivity value, use the UP and DOWN arrows (the range is 0.10 to 1.00). The current emissivity setting is always shown at the top of the LCD display. A setting of 0.95 covers about 90% of all applications and, when in doubt, should be set as such. Emissivity is discussed in a dedicated section of this manual.

MAX (Maximum function)

In the MAX mode, only the highest reading encountered in the current measurement session is displayed

MIN (Minimum function)

In the MIN mode, only the lowest reading is displayed

DIF (Max minus Min value)

In the DIF mode, the MAX less the MIN is displayed.

AVG (Average value)

In the AVG mode, all of the readings in the current measurement session are averaged and the value is displayed.

HAL (High Alarm setting)

The temperature that, when exceeded, causes the audible/visual alarm to trip.

LAL (Low Alarm setting)

The temperature that, when exceeded high to low, causes the audible/visual alarm to trip.

High and Low Alarm Feature

The Model 42540a has an alarm feature whereas a High Alarm setting and a Low Alarm setting can be programmed by the user. When either Alarm point is reached the meter will alert the user via an audible beep and LCD display icon. Follow the steps below:

1. Press the MODE button until the HAL (High Alarm) parameter is displayed. Use the UP and DOWN arrow keys to set the desired High Alarm temperature setting.
2. Press the MODE button until the LAL (Low Alarm) parameter is displayed. Use the UP and DOWN arrow keys to set the desired Low Alarm temperature setting.
3. When an alarm limit is reached, the audible alarm will sound and the display icon HIGH or LOW will appear on the LCD.
4. Note that if the bottom switch (located in the battery compartment) is set to OFF, the audible alarm will be disabled.

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Battery Replacement

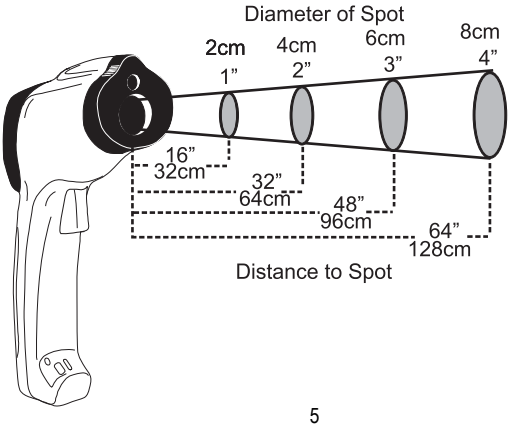
When the battery symbol appears empty or close to empty, replace the meter's 9V battery. The battery compartment is located behind the panel that surrounds the meter's trigger. The panel can be pried open near the trigger and folded down as shown in the diagram. Replace the 9V battery and close the battery compartment cover.

IR Measurement Notes

1. The object under test should be larger than the spot (target) size calculated by the field of view diagram (printed on the side of the meter and in this guide).
2. Before measuring, be sure to clean surfaces that are covered with frost, oil, grime, etc.
3. If an object's surface is highly reflective, apply masking tape or flat black paint to the surface before measuring. Allow time for the paint or tape to adjust to the temperature of the surface it is covering.
4. Measurements through transparent surfaces such as glass may not be accurate.
5. Steam, dust, smoke, etc. can obscure measurements.
6. The meter automatically compensates for deviations in ambient temperature. However, it can take up to 30 minutes for the meter to adjust to extremely wide changes.
7. To find a hot spot, aim the meter outside the area of interest then scan across (in an up and down motion) until the hot spot is located.

Field of View

The meter's field of view is 16:1. For example, if the meter is 16 inches from the target (spot), the diameter of the target must be at least 1 inch. Other distances are shown in the field of view diagram. Note that measurements should normally be made as close as possible to the device under test. The meter can measure from moderate distances but the measurement may be affected by external sources of light. In addition, the spot size may be so large that it encompasses surface areas not intended to be measured.



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Emissivity and IR Measurement Theory

IR Thermometers measure the surface temperature of an object. The thermometer's optics sense emitted, reflected, and transmitted energy. The thermometer's electronics translate the information into a temperature reading which is then displayed on the LCD.

The amount of IR energy emitted by an object is proportional to an object's temperature and its ability to emit energy. This ability is known as emissivity and is based upon the material of the object and its surface finish. Emissivity values range from 0.1 for a very reflective object to 1.00 for a flat black finish. For the Model 42540a, the emissivity is adjustable from 0.1 to 1.00. Most organic materials and painted or oxidized surfaces have an emissivity factor of 0.95. When in doubt, set the emissivity to 0.95.

Emissivity Factors for Common Materials

Material under test	Emissivity	Material under test	Emissivity
Asphalt	0.90 to 0.98	Cloth (black)	0.98
Concrete	0.94	Skin (human)	0.98
Cement	0.96	Leather	0.75 to 0.80
Sand	0.90	Charcoal (powder)	0.96
Soil	0.92 to 0.96	Lacquer	0.80 to 0.95
Water	0.92 to 0.96	Lacquer (matt)	0.97
Ice	0.96 to 0.98	Rubber (black)	0.94
Snow	0.83	Plastic	0.85 to 0.95
Glass	0.90 to 0.95	Timber	0.90
Ceramic	0.90 to 0.94	Paper	0.70 to 0.94
Marble	0.94	Chromium Oxides	0.81
Plaster	0.80 to 0.90	Copper Oxides	0.78
Mortar	0.89 to 0.91	Iron Oxides	0.78 to 0.82
Brick	0.93 to 0.96	Textiles	0.90

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Specifications

Infrared Thermometer Specifications

Range / Resolution	-58 to 1400°F (-50 to 760°C)	0.1°C/F over entire range
Accuracy *(of reading)*	± 2% of reading or 4°F (2°C) whichever is greater < 932°F (500°C) ± (2.5% of reading + 5°) > 932°F (500°C) Note: Accuracy is specified for the following ambient temperature range: 64 to 82°F (18 to 28°C)	
Emissivity	Adjustable from 0.1 to 1.00 (0.95 default value)	
Field of View	D/S = Approx. 16:1 ratio (D = distance, S = spot)	
Laser power	Less than 1mW	
Spectral response	6 to 14 μm (wavelength)	

General Specifications

Display	4½ digit backlit LCD display with function indicators
Display rate	1 second approx.
Operating Temperature	32°F to 122°F (0°C to 50°C)
Operating Humidity	Max. 80% RH.
Power Supply	9V battery
Automatic Power Off	Approx. 6 seconds after the trigger is released
Safety compliance	CE
Weight	10.2 oz. / 290g
Dimensions	3.9 x 2.2 x 9.0” (100 x 56 x 230mm)

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Warranty

FLIR Systems, Inc. warrants this Extech Instruments brand device *to be free of defects in parts and workmanship for* ***one year*** *from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department for authorization. Visit the website for contact information. A Return Authorization (RA) number must be issued before any product is returned. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. FLIR Systems, Inc. specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. FLIR's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.*

Calibration, Repair, and Customer Care Services

FLIR Systems, Inc. offers repair and calibration services for the Extech Instruments products we sell. NIST certification for most products is also provided. Call the Customer Service Department for information on calibration services available for this product. Annual calibrations should be performed to verify meter performance and accuracy. Technical support and general customer service is also provided, refer to the contact information provided below.

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